

## A SYNOPSIS OF THE ODYNERUS BOSCI GROUP IN NORTH AMERICA (HYMENOPTERA, VESPIDAE).

BY RICHARD M. BOHART, University of California, Los Angeles.

The species of *Odynerus* related to *boscii* Lepeletier can be distinguished from those of other North American groups of the subgenus *Rygchium* by the following combination of characters:

Lateral angles of propodeum sharp and dentiform; dorsal surface of first abdominal tergite with at least a few scattered punctures medially; second tergite well punctured throughout and usually reflexed apically; male middle femur without a basal depression; last segment of male antenna nearly conical, slightly curved, not conspicuously flattened; depression on vertex of female not extending beyond lateral ocelli.

The *boscii* group appears to be most closely related to the *rugosus* group, and *exoglyphus* is possibly an annectant form as indicated under the discussion of that species. On the other hand there is some affinity shown towards the *annulatus* group and a nice parallelism exists in color variation between the races of *annulatus* Say and *boscii*. This has resulted in a confusion of the two species in many collections. Several related species occur in Europe. Of these, *O. dantici* (Rossi) closely resembles *boscii auranus*.

Part of the material used in this study was borrowed from the California Academy of Sciences, the U. S. National Museum, the University of Kansas, Washington State College, Pomona College, J. Bequaert, P. H. Timberlake, E. G. Linsley, and C. D. Michener. I am particularly grateful to Dr. Bequaert for his valuable advice and loan of material from his extensive collection.

### KEY TO THE ODYNERUS BOSCI GROUP IN NORTH AMERICA.

1. Hair on horizontal portion of first tergite, as seen in profile, longer than median ocellus; apex of male clypeus semicircularly incised; body black marked with yellow or whitish ..... 2  
Hair on horizontal portion of first tergite shorter than median ocellus; apex of male clypeus not semicircularly incised 3
2. Black marked with yellow ..... *exoglyphus*  
Black marked with whitish ..... *exoglyphus albovittatus*
3. Inferior ridge of propodeum below the lateral angle crenulate; first tergite uniformly punctured all over; male clypeus about one and a half times as broad as long, apex usually almost straight except for small lateral teeth; subapical

- tooth of male mandible much larger and higher than the middle tooth . . . . . *fuscus*
- Inferior ridge of propodeum below lateral angle not crenulate; male clypeus almost as long as broad, apex usually evenly concave; subapical tooth of male mandible only slightly higher and larger than the middle tooth . . . . . 4
4. Body markings black, reddish, and yellow; or if black and yellow, sixth tergite black. Dorsal surface of first tergite smooth and impunctate except for lateral areas of coarse punctures and a few scattered punctures medially  
*boscii boscii*
- Body markings almost entirely yellow; black, whitish, and reddish; or black and yellow with the sixth tergite marked with yellow . . . . . 5
5. Body largely black and yellow, sixth tergite marked with yellow in both sexes; apex of second tergite with a varying amount of reflex . . . . . *boscii auranus*
- Body markings not mainly black and yellow . . . . . 6
6. Body largely yellow with small amounts of reddish; apex of second tergite usually strongly reflexed . . . . . *boscii azotopus*
- Body black, whitish, and red; legs red . . . . . *boscii albivestis*

*Odynerus fuscus* Cresson

*Odynerus fuscus* Cresson, 1872. Tr. Amer. Ent. Soc., 4: 238.

*Odynerus fuscus* Dalla Torre, 1894. Catal. Hymenopterorum, 9: 70.

The range of *fuscus* over Mexico and the southern and eastern parts of United States appears to be much the same as that of *boscii* and the two species are very closely allied. The clypeal and mandibular differences in the male should be sufficient to separate the two. The puncturation of the first abdominal tergite and crenulation of the propodeal angles are not characters of sterling specific worth but they form a convenient means of determination particularly if only a female is at hand.

*O. fuscus* varies markedly in coloration from the predominantly black and yellow northern type to the more reddish and yellow southern type. This variation seems hardly constant enough to warrant the setting up of subspecies. The following is a brief redescription of the species as treated in this paper.

Black and yellow, marked with reddish in varying degrees, sometimes almost entirely reddish; wings smoky, violaceous. Pubescence obscure, pale and hardly two ocellus lengths on the front. Puncturation moderate to coarse and covering entire

body except front face of pronotum and hind face of propodeum which is irregularly and often weakly striate. Mandible of male five-toothed, subapical tooth much larger and protruding much farther than middle tooth; apex of clypeus in male nearly straight or slightly convex between lateral teeth, male clypeus about one and a half times as broad as long; last antennal segment of male curved but not flattened, reaching beyond the base of tenth; inter-ocellar area slightly swollen; pronotal carina strong, lateral angles sharp; propodeum with its dorso-lateral face bearing very large punctures, terminating in dentiform angles laterally and near post-scutellum and crenulate between lateral angles and insertion of abdomen, hind face concave; male middle femur normal; apex of second abdominal tergite impunctured and often reflexed; length to apex of second tergite, male, 11-13 mm., female, 11-14 mm.

Records. Massachusetts, Michigan, New Jersey, Illinois, Mississippi, Oklahoma, Georgia, Florida, and Texas; Cuernavaca and Guadalajara, Mexico.

*Odynerus boscii* Lepeletier

*Odynerus boscii* Lepeletier, 1841. Hist. Insect. Hymén., 2: 637.

*Odynerus castigatus* Saussure, 1852. Etud. Fam. Vespid., 1: 178.

Although it is not a common species, *boscii* occurs from Massachusetts to Coahuila, Mexico. It varies in coloration much as does *fusus* from which it is separated mainly by the different shape of the clypeus in the male. The typical form varies from black and yellow to black, reddish and yellow but only the three western races have sufficiently distinct markings to warrant subspecific names. The following is a short redescription of the typical form as defined in this paper.

Black, marked with yellowish and usually with reddish, sometimes mostly reddish and yellow; wings smoky and violaceous or reddish. Pubescence pale and short. Puncturation moderate to coarse and covering entire body except front face of pronotum, hind face of propodeum, and dorsum of first abdominal tergite which is sparsely punctured only. Mandible of male five-toothed, subapical tooth not much larger or higher than middle tooth; apex of male clypeus evenly concave, the clypeus almost as long as broad; last antennal segment of male curved but not flattened, reaching to base of tenth; inter-ocellar area slightly swollen; pronotal carina

strong, lateral angles sharp; propodeum with its dorso-lateral face bearing very large punctures, terminating in one or more dentiform angles laterally and near postcutellum but not crenulate between lateral angles and insertion of abdomen, hind face concave; male middle femur normal; apex of second abdominal tergite impunctured and often reflexed; length to apex of second tergite, male, 11-13 mm., female, 11-14 mm.

Records. Massachusetts: Stony Brook. Michigan: Muskegon and Ogemaw Co., New Jersey: Ramsey and Newfoundland. Texas: Austin. Mexico: One male, Torreon, Coahuila, June 17, 1937 (A. R. Mead).

***Odynerus bosicii azotopus* Bohart, n. subsp.**

This subspecies resembles the more yellow specimens of *annulatus oslari* Cameron which occurs over the same region. The puncturation of the first abdominal tergite varies from nearly smooth to strongly punctured in a series from a single locality. Also, the clypeus is unusually variable in shape.

Male. Yellow; antenna mostly, vertex and occiput mostly, mesonotum, legs partly, bases of first two abdominal tergites, light reddish; antenna apically, ocellar area, margin of mesonotum, black. First abdominal tergite strongly punctured throughout; apical margin of second tergite strongly reflexed flange-like; length to apex of second tergite 9.5 mm.

Female. Coloration about as in male. Black in ocellar area restricted to margins around ocelli. Length to apex of second tergite 12 mm.

Holotype male, five miles north of Indio, California, Apr. 10, on *Prosopis juliflora* (C. D. Michener); allotype female, Indio, Calif., Oct. 28, 1933 (P. H. Timberlake). Paratypes, Arizona: Two females, Phoenix; California, twenty males and nineteen females from the following localities: Furnace Creek, Inyo Co.; Blythe, Yermo, and Barstow, San Bernardino Co.; Coachella, Indio, and Palm Springs, Riverside Co.; San Felipe Creek and Calexico, Imperial Co. Holotype and allotype in California Academy of Sciences, paratypes in collections of U. S. National Museum, J. Bequaert, P. H. Timberlake, E. G. Linsley, C. D. Michener, and the author.

***Odynerus bosicii auranus* Cameron**

*Odynerus auranus* Cameron, 1903. *Invertebrata Pacifica*, 1: 148.

This subspecies corresponds in color markings to *annulatus sulphureus* which occurs with it. Occasional specimens have a trace

of reddish on the vertex or mesonotum but not on the first abdominal tergite. The reflexing of the apex of the second tergite varies considerably. In general the specimens from the eastern side of the Sierras have a greater amount of black markings and a lesser amount of reflex.

Records. Nevada: Ormsby Co. (Cameron type); Minden, July. Washington: Orondo, June. California: Lake City, Modoc Co.; Mammoth and Tioga Pass, Mono Co.; Putah Canyon, Solano Co.; Antioch, Contra Costa Co.; Lone Pine and Independence, Inyo Co.; Briceburg, Mariposa Co.; Sequoia National Park, Tulare Co.; Mt. San Jacinto, San Bernardino Co.

***Odynerus boscii albivestis* Bohart, n. subsp.**

The black, white, and red aspect of this form makes it easily recognizable. A similarly colored phase of *annulatus* occurs with it.

Male. Black; mandible mostly, clypeus, first antennal segment in front, large inter-antennal spot, lower orbit, prothorax in front, small spot on tegula, spot below tegula, spot on lateral angle of propodeum, spot on middle coxa, apical bands on tergites one to five and sternites two and three, a lateral attached spot on second tergite, whitish; antenna mostly, post-ocular spot, tegula mostly, two spots on scutellum, legs almost entirely, reddish; apex of antenna, fifth to seventh abdominal tergites, brown. Clypeus longer than broad; apex of second tergite strongly reflexed; third tergite coarsely punctured; length to apex of second tergite 9 mm.

Female. Markings as in male with following exceptions: Mandible red; clypeus red and black; first antennal segment, lower orbit, and inter-antennal spot, red; pronotum white, red, and black; last abdominal segment red; venter black except for last sternite. Length to apex of second tergite 13 mm.

Holotype male, Grand Coulee, Washington, July 10, 1902; allotype female, Patterson Ferry, Umatilla Co., Oregon, June 18, 1936 (I. McCracken), on *Hymenoptus*. Paratypes, Washington: One female, Grand Coulee, June 29, 1902; one female, Almota (R. W. Doane); one female, Hatton, July 23 (R. C. Shannon). Idaho: One female, Burley, July 6, 1931 (M. W. Sanderson). Oregon: One female, Arlington, July 15, 1931 (R. H. Beamer). Wyoming: One female, Granger, 6400 ft., August 5, 1934 (H. A. Scullen). Colorado: Two males, Mountain Home Lake, Fort Garland, 8300 ft., July 20-25, 1932. Holotype and allotype in California Academy of Sciences, paratypes in collections of University of Kansas, J. Bequaert, and the author.

**Odynerus exoglyphus** Bohart, n. sp.

Two other North American species of *Rygchium* with semi-circularly incised clypeus in the male are *oratus* Cameron and *delicatus* Cresson which are closely related to *annulatus*. In these two species, however, both sexes have the clypeus incised, whereas in *exoglyphus* this character is found only in the male. *O. aldrichi* Fox which is intermediate between *Rygchium* and *Odynerus* s.s. has the clypeus of the male incised but in addition has strikingly deformed mandibles. Both sexes of *aldrichi* have continuous whitish transverse bands across the scutellum and postscutellum. A further relationship with *rugosus* Saussure and *leucomelas* Saussure is indicated by the dark-colored last tarsal segment in the males of the three species although this is least pronounced in *exoglyphus*.

Male. Black; mandible mostly, clypeus, first antennal segment in front, inter-antennal spot, lower orbit, post-ocular spot, pronotum in front, tegula mostly, spot below tegula, line on postscutellum, lateral spot on propodeum, legs mostly, apical margins of all abdominal segments except the last, lateral attached spots on first two tergites, second sternite almost entirely, yellow; inner surface of flagellum to the ninth segment, tarsi partly, fulvous to reddish; wings smoky, slightly violet. Pubescence short and moderately thick, that on front about one to two ocellus lengths, that on mesonotum and first abdominal tergite about one ocellus length, that on remainder of abdomen minute. Head and thorax closely but not coarsely punctured, the punctures separated by less than a puncture diameter; horizontal surface of first and base of second abdominal tergites evenly punctured, the punctures separated by about three puncture diameters; second and to a lesser extent the following tergites coarsely punctured apically. Mandible obscurely five-toothed; clypeus with a semi-circular apical emargination; last antennal segment finger-like, as long as fourth, apically blunt; front face of pronotum punctured sparsely laterally; pronotal angles sharp but rounded; propodeum laterally rough and dentiform, hind face finely striate; middle femur without a baso-ventral depression; aedeagus and volsellae slender; length to apex of second tergite 9 mm.

Female. Markings, pubescence, and puncturation about as in male with exceptions as follows: Mandibles mostly black; clypeus with a median longitudinal stripe, two yellow spots on scutellum and on last abdominal tergite. Clypeus shallowly incised at apex; vertex with a small indistinct depression; length to apex of second tergite 11 mm.

Holotype, allotype, and eleven male paratypes, Indian Flat, Mariposa Co., California, June 3, 1938 (R. M. Bohart). Other paratypes, California: Davis Creek, Modoc Co.; Walker, Siskiyou Co.; Tuolumne Co.; Briceburg and El Portal, Mariposa Co.; Lone Pine, Inyo Co.; Kaweah, Tulare Co.; Putah Canyon, Solano Co.; Mt. Diablo, Contra Costa Co.; Paraiso Springs and Bradley, Monterey Co.; Santa Lucia Mts., Monterey Co. (C. D. Michener, Hastings Nat. Hist. Survey); Coalinga, Fresno Co.; four males, Tetley Park, San Bernardino Co., May 23, 1936, on *Potentilla glandulosa* (P. H. Timberlake). Other records: One male, Utah?; one female, Moscow Mt., Idaho; one female, Blue Mts., Washington, June 27, 1922 (V. N. Argo). The months of flight are May and June. Holotype and allotype in the California Academy of Sciences, paratypes in the collections of U. S. National Museum, University of Kansas, Academy of Natural Sciences of Philadelphia, J. Bequaert, P. H. Timberlake, E. G. Linsley, C. D. Michener, and the author.

***Odynerus exoglyphus albovittatus* Bohart, n. subsp.**

This subspecies represents the white-marked Great Basin and Rocky Mountain race of *exoglyphus*. There does not seem to be any constant structural difference between the two races and occasional examples of *exoglyphus* show an approach in color to *albovittatus*.

Male. Black, marked as in *exoglyphus* but with whitish instead of yellow; last two abdominal segments black. Length to apex of second tergite 8 mm.

Female. Last abdominal segment and venter black except for disconnected stripe on second sternite; spot on second tergite isolated. Length to apex of second tergite 10 mm.

Holotype male, Mary's River, Elko Co., Nevada, 3000 ft. July 8, 1935 (P. H. Baldwin); allotype female, near San Jacinto, Elko Co., Nevada, 5900 ft., July 10, 1935 (P. H. Baldwin). Paratypes, Nevada: One male and four females, Elko Co., July, P. H. Baldwin). Wyoming: One male, Bridger Basin (S. Garman); one female, Yellowstone National Park, July 27, 1923 (A. L. Melander); one male and five females, Jennie Lake, July, 1935 (J. McSwain). Washington: Two males and six females, Toppenish, June to August (A. L. Melander and V. Argo). Oregon: Two males and one female, Harney Co., July; eight females, Alkali Lake, Lake Co., June 18, 1934 (S. C. Jones and J. Schuh). Holotype and allotype in California Academy of Sciences, paratypes in collections of U. S. National Museum, J. Bequaert, P. H. Timberlake, and the author.